Draft Environmental Assessment

Reconstruction of the Monte Cristo Grade Road

Snohomish County, WA
FEMA-1499-DR-WA (Public Assistance)
April 2005

FEMA

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FEMA Region X
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ACRONYMS AND ABBREVIATIONS

BA	Biological Assessment
BMP	Best Management Practice
CFR	Code of Federal Regulations
cfs	cubic feet per second
Corps	U.S. Army Corps of Engineers
Cy	Cubic yards
dbh	Diameter at breast height
DPS	Distinct Population Segment
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
FR	Federal Register
ft	feet
LWD	Large woody debris
MSE	mechanically stabilized earth
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
OHWM	Ordinary High Water Mark
PHS	Priority Habitats and Species
RM	River Mile
ROW	right-of-way
SCC	Snohomish County Code
SCPW	Snohomish County Public Works
SCS	Soil Conservation Service
SCSWM	Snohomish County Surface Water Management
SHPO	State Historic Preservation Office
SLE	Stillaguamish Lead Entity
STAG	Stillaguamish Technical Advisory Group
TMDL	Total Maximum Daily Load
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WAC	Washington Administrative Code
WAU	Watershed Assessment Unit
WDF	Washington Department of Fisheries
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WDOE	Washington Department of Ecology
WRIA	Water Resource Inventory Area
WSCC	Washington State Conservation Commission

1.0 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

Record rainfall occurred in Washington during October 19-21, 2003 that led to extensive flooding throughout the region. Flooding along the North Fork Stillaguamish River in Snohomish County caused erosion of about 650 feet (ft) of the Monte Cristo Grade Road just outside of Verlot, Washington. Snohomish County requested funding from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) to repair the road. Because the river now occupies the footprint of the old road and the concern for potential effects to fish and the Wild and Scenic values of the river, several alternatives were developed to reconstruct a new alignment. Because the Monte Cristo Grade Road would be moved away from the river, outside of its former footprint, FEMA must complete an Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA). Pursuant to FEMA's regulations found in 44 Code of Federal Regulations (CFR) Part 10, FEMA prepared this EA for funding of the reconstruction of the road.

1.2 PURPOSE AND NEED FOR ACTION

The purpose of FEMA's Public Assistance Program is to assist communities in recovering from damages caused by natural disasters. The purpose of the action alternatives presented in this EA is to restore the Monte Cristo Grade Road to its original predisaster function.

The need for the project is to provide vehicle access to Monte Cristo Grade Road for eight properties, including one year-round resident. The vehicle access was lost when the North Fork Stillaguamish River washed away about 650 feet of the Monte Cristo Grade Road, which connects to U.S. Forest Service (USFS) Road #42 and then to the Mountain Loop Highway.

1.3 LOCATION AND BACKGROUND

The Monte Cristo Grade Road wash-out is located on private property at approximately River Mile (RM) 47.2, along the southern, or left bank (facing downriver), just outside the town of Verlot in Township 30N, Range 8E, Section 15 (Figure 1-1). The road wash-out is located about 0.1 mile from the intersection with Pilchuck Mountain Road (USFS Road #42), which meets Highway 92 (the Mountain Loop Highway) just east of a major bridge (Photo 1). It is estimated that the flood flows reached an elevation of 984 ft at the wash-out site, which is approximately 10-12 ft above the low-flow river levels (Van Wormer 2005). The high flow undermined the mostly unconsolidated hillside upon which the road was located. The 2003 flood removed 40 to 60 ft (horizontal distance) of the riverbank, which amounted to 30,000-40,000 cubic yards (cy) of sand, gravel, and cobble (Van Wormer 2005). Snohomish County has installed concrete barricades near

Photo 1. Monte Cristo Grade Road wash-out looking upstream.

the intersection with Pilchuck Road to prevent vehicular access. Approximately 2 miles of road is isolated by the wash-out. Currently, residents must walk around the wash-out to reach their properties. The adjacent land is privately owned; USFS administered land in the Mt. Baker-Snoqualmie National Forest is located immediately south of the project location.

Insert Figure 1-1. Project Location.

Back of Figure 1-1.

2.0 ALTERNATIVES

The following sections describe the alternatives that were carried forward for a full analysis, followed by a brief description of those that were initially considered but not carried forward in the full analysis. The information was obtained from options presented in conceptual designs prepared for Snohomish County (Van Wormer 2005).

2.1 ALTERNATIVES ANALYZED IN THIS EA

Evaluation of the range of potential alternatives to restore vehicle access resulted in four alternatives carried forward for full analysis:

Alternative A – No Action Alternative;
Alternative B – Northern alignment that is between the river bluff and a small tributary stream;
Alternative C – Middle alignment that is immediately upslope of the tributary; and
Alternative D – Southern alignment that is slightly farther upslope in some locations.

The following sections describe these alternatives.

2.1.1 ALTERNATIVE A – NO ACTION ALTERNATIVE

NEPA suggests including analysis of a "No Action Alternative," against which the effects of the action alternatives can be evaluated and compared. For the purpose of this EA, the No Action Alternative would keep the road in its current state of disrepair. No effort would be made to provide vehicle access to private residences or the private land farther downstream from the road wash-out. Snohomish County would continue to maintain barriers at the eastern end of the road near the junction with the Pilchuck Road. FEMA funding, while available for a reconstruction of a damaged road, is not available for a land purchase program with unwilling sellers. Thus, Snohomish County would be responsible for the cost of any private property buy-out program that might be proposed to mitigate for the loss of personal use of the lands affected by the wash-out.

2.1.2 ALTERNATIVE B – NORTH ALIGNMENT (Preferred Alternative)

Under Alternative B (Snohomish County Option B, as presented in the Monte Cristo Grade Road Conceptual Design Report [Van Wormer 2005]), the replacement roadway segment would connect with the Pilchuck Road at elevation 1,031 ft, near the maximum radius of the curve. The eastern portion of the alignment would follow an existing bulldozed grade to a lower terrace and then follow the gently sloping terrain to the existing Monte Cristo Grade Road. The new road segment under this alternative would be approximately 880 ft in length and would rejoin the unaffected western portion of the road approximately 70 ft east of an existing culvert under the Monte Cristo Grade Road that drains an unnamed tributary (Figure 2-1). This alternative would not require any stream crossings, although the existing roadside ditch along the Monte Cristo Grade Road would be crossed.

The new road would be constructed using Snohomish County standards for primitive roadways and would be 20 ft wide in most locations; the roadbed would be expanded to 22 ft wide where walls or guardrails would be installed. A cross-section of a typical roadway section is illustrated in Figure 2-2. This alternative would minimize cut-and-fill activities and would require minimal Mechanized Stabilized Earth (MSE) to stabilize fill. Snohomish County estimates that a total of 1,243 and 398 cy of cut-and-fill, respectively, would be required under this alternative. These structures are needed on the fill slope to accommodate the seepage of water that is evident along the toe of the slope near the stream. MSE wall systems are typically constructed of free-draining granular materials that allow seepage and maintain the integrity of the road prism. The alignment would require clearing and grading within a corridor that is up to approximately 70 ft wide in some locations.

No riverbank stabilization along the actively eroding riverbank would be included in this alternative. No features would be constructed within or anywhere near the ordinary high water mark (OHWM) of the South Fork Stillaguamish River, but some construction would take place within 20 ft, but not within, the unnamed tributary. However, approximately 200 ft of the road would be constructed on top of inactive channels of the stream. No blasting would be required under this alternative. Best Management Practices (BMPs), as listed in Appendix B, would be implemented to minimize construction-related erosion and sedimentation. All state standards for water quality and stormwater control would be met. Alternative B (and all other action alternatives) would include the removal of the 24-inch culvert that protrudes from the left bank in the eastern end of the remaining road. Construction would be completed over one construction season during the summer when rainfall is significantly less frequent than the rest of the year.

2.1.3 ALTERNATIVE C – MIDDLE ALIGNMENT

Alternative C (Snohomish County Option C) would join Pilchuck Road at the same location as Alterative B but would not veer north toward the river; instead, it would go west along an upper terrace for approximately 400 ft, then cross the unnamed tributary creek and travel along the base of the steeper slope until it would gradually join the intact Monte Cristo Grade Road approximately 400 ft west of the existing culvert crossing (Figure 2-3). The new road alignment would be approximately 1,200 ft in length. In addition to crossing the main channel of the stream, the road would also cross two perennial tributaries that feed into the stream. Each stream crossing would require a culvert (box or metal). Stream crossing design would include a concrete ford to allow passage of high flows over the road. A 275-ft-long MSE wall would be constructed to support the downhill side of the roadbed near the stream. This wall would be up to 14 ft tall. The western end of the alignment would also cross a wetland formed by collection of several seeps and unnamed streams draining the hillside to the south. This alternative may require some over-excavation and placement of structural fill in the wet seeps along the hillside (Findley et al. 2005). Snohomish County estimates that this alternative would require 3,090 and 5,563 cy of cut-and-fill, respectively. Most of cutting would take place along the eastern 200 ft of the alignment where much of the grade needs to be lowered.

Insert Figure 2-1. Monte Cristo Grade Road Alternative B Alignment.

Back of Figure 2-1.

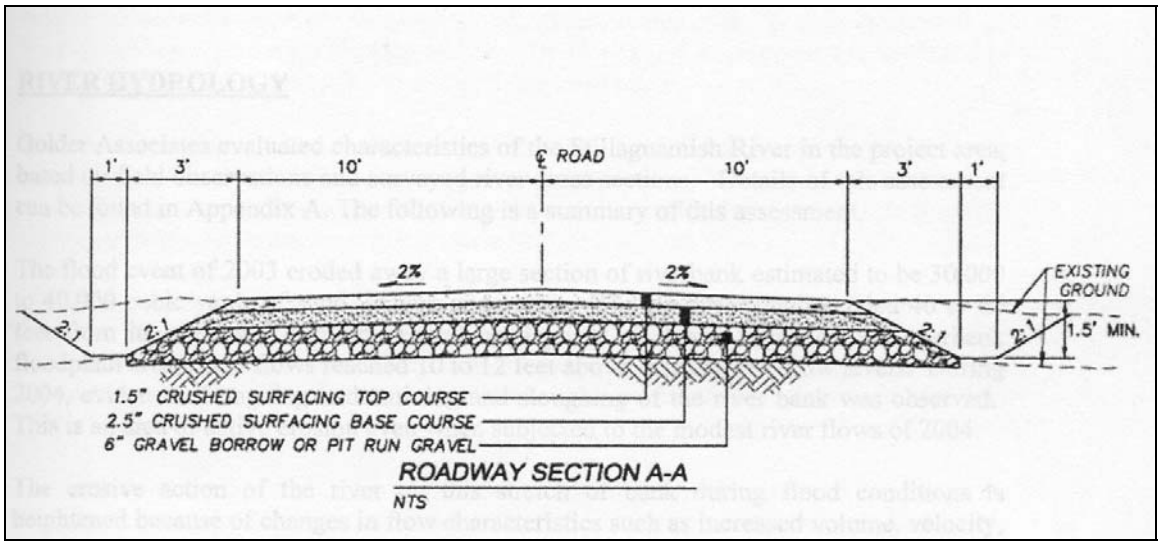


Figure 2-2. Typical Road Cross-Section.
(Source: Reproduced from Van Wormer [2005]).

Minimal blasting would be required in areas where bedrock is encountered. The alignment would require clearing and grading within a corridor up to approximately 70 ft wide.

Construction would be completed over one construction season during the summer when rainfall is significantly less frequent than the rest of the year. All state standards for water quality and stormwater control would be met.

2.1.4 ALTERNATIVE D – SOUTHERN ALIGNMENT

Alternative D (Snohomish County Option E) is a variation of Alternative C, in that it follows the same alignment except for approximately 400 ft that would be shifted farther to the south to avoid paralleling the unnamed stream so closely (Figure 2-4). This alternative was included because it allows for more of the roadway to be situated over bedrock. This alternative would be approximately 1,260 ft in length. Because the alignment is on steeper terrain to the south of the stream, construction would require 3,240 and 4,415 cy of cut-and-fill, as well as a 275-ft-long MSE wall that is up to 14 ft tall to support the downhill side of the roadbed near the stream. The alignment would cross the main channel of the unnamed stream once and three of its tributaries, resulting in a total of four stream crossings (Figure 2-4). Each of these stream crossings would require culverts combined with concrete fords to allow high flows to pass over the road. Minimal blasting would be required in areas where bedrock is encountered. The width of the clearing and grading would be similar to that for Alternative C.

Construction would be completed over one construction season during the summer when rainfall is significantly less frequent than the rest of the year. All state standards for water quality and stormwater control would be met.

2.2 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

Three alternatives/options for road repair were initially reviewed but eliminated from detailed analysis in this EA due to environmental effects, failure to meet the project purpose, or cost. The first option considered was to reconstruct the road along the preexisting centerline (Figure 2-1). It quickly became apparent that this was not a viable option as the South Fork Stillaguamish River now occupies much of the 650-ft washed out roadbed location and a high (up to 40 ft tall) bluff would need extensive excavation and stabilization to rebuild the road. Snohomish County estimates that over 20,000 cy of fill would be required to rebuild the roadway in its former location. In addition, this alternative would require substantial ongoing maintenance to prevent future erosion from natural river channel migration. Because of the long-term erosion, costs (estimated at nearly $3.8 million), and the effects to aquatic resources, this option is not considered viable.

The second road alignment considered but eliminated from detailed analysis in this EA is Snohomish County's Option D, which would have required the construction of a new road within perennial streams and a series of seeps and small wetlands located approximately 150 feet from the wash-out and the relocation of a perennial stream. This option would require extensive use of MSE to minimize impacts to the streams and would require significant grading (cut-and-fill) on steep slopes. A modified, less intrusive version of this alternative that avoids the streams by going farther to the south is analyzed in detail in this EA.

A third road option (Snohomish County's Option F) that was initially considered but eliminated from detailed analysis was the construction of a 3,500-ft-long road from USFS Road #42 directly upslope of the wash-out. This option was eliminated due to the cost ($5.3 million), long length, need for numerous switchbacks to minimize road grade, the approximately 39,978 cy of cut and 12,157 cy of fill, and the likely environmental impacts to streams on the hillside.

Insert Figure 2-3. Monte Cristo Grade Road Alternative C Alignment.

Back of Figure 2-3.

Insert Figure 2-4. Monte Cristo Grade Road Alternative D Alignment.

Back of Figure 2-4.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The following sections discuss the existing conditions by resource and the potential effects of the four alternatives. Cumulative impacts are discussed separately for all resources in Section 3.12. Measures to minimize project impacts are built into the three action alternatives.

3.1 SOILS, GEOMORPHOLOGY, AND STREAMBANK STABILITY

3.1.1 Affected Environment

The project site is situated on the lower slopes of a predominantly north-facing slope of Pilchuck Mountain. The immediate project site is composed of thick layers of fluvial and glacial outwash deposits on bedrock (Van Wormer 2005). The eroded riverbank reveals three layers of outwash: (1) an upper layer dominated by gravely sand and cobble, (2) a middle layer composed of fine sand, and (3) and lower gravely sand layer. This lower layer is being actively eroded by the river which, in turn, results in the upper layers giving way. A summary of geologic observations for the site was provided by Findley and Kammereck (2004), which characterized the road location as being on a glaciofluvial terrace approximately 30 ft above the river. The general geology is mapped as Pleistocene glacial deposits overlying Western Melánge Belt lithologies (Tabor 1988 as cited in Findley and Kammereck 2004). There are several small bedrock outcroppings near the unnamed stream, suggesting a rather irregular bedrock surface. The steep slopes to the east of the eroded bluff are likely underlain with bedrock.

Snohomish County conducted a separate geophysical survey in January 2005 to evaluate the depth of bedrock in the area of the different road alignment options (Findley et al. 2005). The geophysical survey found that the bedrock surface generally dips to northeast with a slope angle of approximately 40 - 60 degrees (Findley et al. 2005). Findley et al. (2005) recommend that, in some locations along proposed road alignments, the exact depth to bedrock should be investigated further to determine appropriate construction techniques. Granular soils with some wet seeps dominate the eastern portion of the alignment, while shallow bedrock occurs along the western portion.

The Snohomish County Soil Survey characterizes the soil at the project site as Skykomish gravelly loam, 0 to 30 percent slopes (U.S. Soil Conservation Service 1983). This soil is very deep, somewhat excessively drained soil and occurs on terraces, terrace escarpments, and outwash plains. The soil formed in glacial outwash and volcanic ash. The substratum to a depth of 60 inches or more is extremely gravelly loamy, coarse sand, and extremely gravelly coarse sand. Included in this unit are areas of Elwell and Olomount soils on mountainsides and ridgetops and Rober soils on terraces and terrace escarpments (U.S. Soil Conservation Service 1983). These soils are seasonally wet.

The combination of channel morphology (the project site is directly in line with the river channel's flood flow alignment) and erodible surfaces suggests that the large volume of outwash deposits along the bluff at the site is likely to continue to actively erode over the long-term (Findley and Kammereck 2004). The presence of the Mountain Loop

Highway bridge just upstream of the project site contributes to the river not being able to migrate as it would under natural conditions. This likely contributes to the river flows constantly eroding the riverbank at the site.

The clay, silt, and sand deposits of glacial and lake origin are the main source of the significant sediment production in the watershed (Perkins and Collins 1997, as cited in WSSC 1999). In the steeper sloped areas, these deposits are particularly prone to landslides. Seventy-five percent of the more than 1,000 landslides documented in the entire Stillaguamish watershed were associated with human disturbance, most commonly clearcuts or roads (Perkins and Collins 1997 as cited in SLE 2004). Major sediment contributions on the South Fork Stillaguamish are at Gold Basin (Stillaguamish Lead Entity [SLE] 2004), which is just upriver from the project. The Gold Basin landslide is listed as a priority site for sediment reduction projects by the SLE (2004).

3.1.2 Environmental Consequences

3.1.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, project geology would remain in post-wash-out conditions as currently exist. Surface conditions are unstable in many locations along the river and Monte Cristo Grade Road where the wash-out has undercut steep slopes. It is highly likely that riverbank erosion will continue, and the area will be a sediment source to the river for some time. The erosion is likely to expand upstream and downstream for several hundred feet in each direction due to the steep slope, erodible soil and geology at the site, and the position of the riverbank directly in line with the flow path of the river, especially during higher flows.

3.1.2.2 Alternative B – North Alignment

Under Alternative B, the road would be realigned south of the previously existing alignment but would be within 20 ft of the bluff for about 75 ft of its length (Figure 2-2). Direct impacts from the footprint of this new alignment would alter surface soils within the right-of-way (ROW). Currently, soils in this potential ROW location consist of a native sandy-loam in the Skykomish series, a soil type typical of forested floodplains in the region. The main limitation for construction activity in this soil type is seasonal soil wetness. In addition, cutbanks are not stable and are subject to collapse (U.S. Soil Conservation Service 1983). Use of wheeled and tracked equipment when the soil in this unit is wet produces ruts, compacts the soil, and damages the roots of trees.

The Alternative B road alignment would require excavation (cut-and-fill of material) along the entire length, particularly along the eastern 200 ft, where the graded ROW would be up to 70 ft wide. Construction activities would disturb the duff layer and soil structure, mobilize soil particles, and even with erosion control BMPs contribute to minor erosion of soil that would enter the unnamed stream. Construction would occur during the dry season, minimizing the potential for significant rainfall events and the corresponding erosion from runoff.

The potential long-term impacts on soils would be greatest in a 200-ft-long segment that would be within approximately 20 ft of the eroded bluff next to the river and virtually adjacent to the unnamed stream that flows through the project area (Figure 2-1). This road segment would be constructed through an old stream channel and would be in direct line of the streamflow. During high flow events, there is potential for erosion of the roadbed subgrade from the unnamed stream. This impact would be minimized by the placement of bank stabilization along the southern edge of the roadbed along the stream. Stabilization along the new roadbed may also deflect flows, resulting in streambank erosion on the opposite (southern) streambank of the unnamed stream.

As under Alternative A, the bluff along the river would continue to erode, further narrowing the distance between the bluff and the new road. Given that even under moderate river flows erosion would continue, and that the subsurface bedrock along this alignment is not higher than the estimated October flood elevation of 984 ft (Findley et al. 2005), river-caused erosion would eventually affect this new road alignment. The length of time the road would remain functional is difficult to predict and would depend on flood frequency, severity, and duration. Alternative B would not affect the channel migration capacity of the South Fork Stillaguamish River as the road is 30-40 ft above the river and there would be no stabilization along the river, only along a portion of the road near the unnamed stream.

3.1.2.3 Alternative C– Middle Alignment

As with Alternative B, Alternative C would require clearing and grading that would disturb soils during construction. While most of the disturbed soils would be similar to those affected by Alternative B, Alternative C would affect steeper slopes and several areas with seeps and wetlands south of the stream that crosses the site (Figure 2-3). In these sites, the construction would disturb hydric soils and would require more engineered stabilization (e.g., MSE walls). This alignment also would affect soils at the three stream crossings. Culverts would be installed to ensure slope stability and allow sediment to pass through the stream. A concrete ford would be constructed to allow high flows (greater than culvert capacity) to flow over the road. During construction, BMPs would be necessary to prevent sediment and debris from entering the stream that will be downslope of the road.

This alternative would involve the construction of a 275-ft-long MSE retaining wall between the road and creek to maintain the road grade. This wall would minimize soil erosion along the creek and is not likely to prevent the stream from its natural course during high-flow events. However, the road and MSE wall would affect long-term hydrology on the slopes and soils. It is not likely that this alternative, which is 150 ft (average) from the river, would affect or be affected by the long-term continued riverbank erosion as it is primarily situated over bedrock that extends above the 984-ft flood level of 2003 (Findley et al. 2005).

3.1.2.4 Alternative D– South Alignment

The impacts to soils and geology under Alternative D would be similar as under Alternative C, but would involve even more cut-and-fill activity due to the steep slopes (Figure 2-4). There would also be one additional stream crossing (for a total of four) that would affect additional sediment transport in the stream. This alternative would be protected from riverbank erosion due to the extensive subterranean bedrock that is above 984 ft (Findley et al. 2005). As in Alternative C, Alternative D crossings would incorporate culverts for low flows and constructed fords to allow the passage of high flows over the road.

3.2 HYDROLOGY AND WATER QUALITY

3.2.1 Affected Environment

The Stillaguamish River basin has a drainage area of approximately 685 square miles (WSSC 1999), and the South Fork Stillaguamish River drainage includes 254 square miles and over 4,618 miles of streams and rivers (WDOE and SCPW 2003). The headwaters of the South Fork Stillaguamish River are at about 6,200 ft elevation. The Monte Cristo Grade Road project site is located near the upstream boundary of the Robe Valley Subbasin in Hydrologic Unit 171100080202 (USGS website). This sub-basin encompasses over 15,000 acres of land. The 20 miles of the South Fork Stillaguamish River just upstream of the project site has a moderate gradient—33 ft vertical change/mile—while the river upstream of that is steep (100 ft/mile) (WDOE and SCPW 2003).

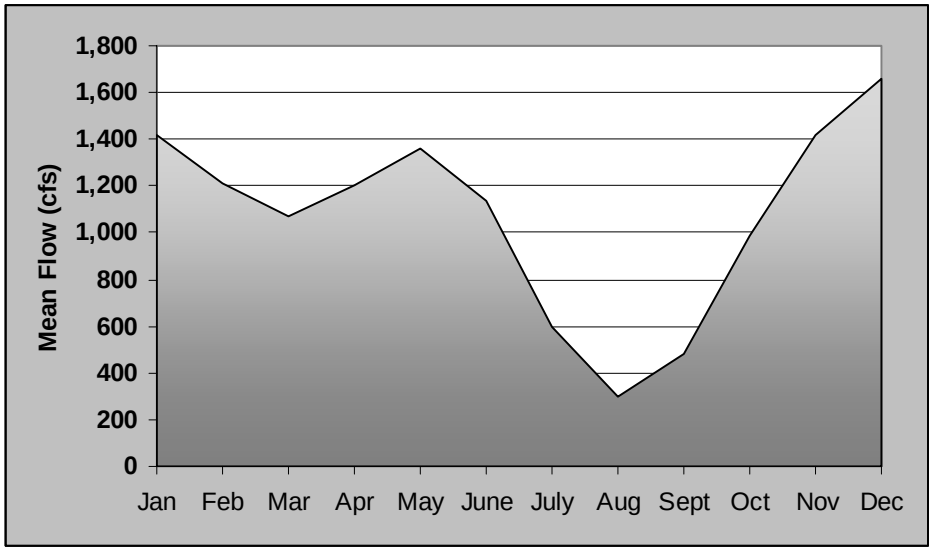
South Fork Stillaguamish flows are often subject to extremes in fluctuation. U.S. Geologic Survey (USGS) flow data over a 53-year period of record for the USGS gage at Granite Falls (gage #12161000) indicate that flows have fluctuated up to a maximum of 32,400 cubic feet per second (cfs) (February 1932) (USGS website). This flow approaches the estimated 100-year flood flow for this gage (Table 3.2-1). Mean monthly flows range from a low of 299 cfs in August to a high of 1,663 cfs in December (Figure 3.2-1). Major tributaries in this sub-basin include: Bear, Black, Boardman, Gordon, Hemple, and Wiley creeks (WSCC 1999). The Robe Valley receives approximately 103 inches of precipitation per year (WDOE and SCPW 2003).

Table 3.2-1. Peak Flows Return Interval at Granite Falls.

Recurrence Interval	Flow (cfs) at Granite Falls
2-year	16,400
5-year	21,700
10-year	25,000
25-year	28,600
50-year	31,900
100-year	34,800
500-year	41,200

Source: WDOE and SCPW (2003)

Figure 3.2-1. Mean Monthly Flows (cfs) at Granite Falls Gage.



Source: USGS Website.

The Robe Valley sub-basin is one of four in the entire Stillaguamish watershed that meet four criteria for being sensitive to forest practices affecting hydrology (SCSWM 2002). These criteria include having:

- A Unit Flood Discharge that is greater than 0.25 cfs/acre
- More than 35 percent of the area in the rain-on-snow zone
- Greater than 12 percent of the forestland in scrub-shrub stage
- Greater than 35 percent of forestland being non-federal

In terms of water quality, the South Fork Stillaguamish upriver of Canyon Creek (RM 33.7) is considered to be Class AA (extraordinary) as defined by the Water Quality Standards for Surface Waters of the State of Washington (Hicks, 2000 as cited in Pelletier and Bilhimer [2001]; Chapter 173-201A-030 WAC). Temperature in Class AA waters are not to exceed 16°C due to human activities (Pelletier and Bilhimer 2001, Chapter 173-201A-030 WAC). The South Fork has a high sediment load (0.5 tons per mi^2 per day) but not nearly as high as the North Fork, which has 4.9 tons per mi^2 per day (Pelletier and Bilhimer 2001).

The Stillaguamish River comprises the Water Resource Inventory Area (WRIA) #5. WRIAs define watershed areas monitored by the Washington Department of Ecology (WDOE) for water quality impairments, contamination, and degradation. Portions of streams and rivers not meeting basic water quality requirements are included on a 303(d) list. No surface waters within the South Fork Stillaguamish basin are included on WDOE's 303(d) list, and only small portions of streams in the lower mainstem Stillaguamish are 303(d) listed. This very limited number of 303(d) listings provides an indication of the general health and quality of water existing in the South Fork

Stillaguamish River basin. However, the number of reported water quality violations in this watershed is increasing as evidenced by Washington State's growing number of 303(d) listings in the Stillaguamish drainage (WSSC 1999). WDOE will eventually implement a Total Maximum Daily Load (TMDL), defined as the sum of all pollutant loads to a water body, for each stream or lake on the 303(d) list. The South Fork Stillaguamish River is a candidate for 303(d) listing for fecal coliform, pH, dissolved oxygen, and temperature (WDOE 1998, as cited in WSSC 1999).

Lands within the Robe Valley sub-basin are dominated by unmanaged forests and areas managed for silviculture. Very few rural communities and developed areas with potential for point-source pollutant contributions occur within the South Fork Stillaguamish River sub-basin upstream of the town of Granite Falls. Thus, the South Fork Stillaguamish River has a very limited potential for water quality impairments. While South Fork Stillaguamish River contaminant risk may be minimal, sediment loading within the river can become extreme depending upon precipitation and land use alteration. South Fork Stillaguamish River sediment load becomes especially high during periods of fall/winter rains and when increased surface flow from snowmelt conveys loose surface substrate from surrounding lands.

Flow characteristics in the river near the project site are likely affected by the presence of the Mountain Loop Highway bridge 0.1 mile upstream. The bridge abutments and the adjacent highway roadbed play a role in directing flows toward the south and not allowing the river channel to naturally migrate the west. At low flows, the thalweg (deepest part of the channel) is farther to the north (away from the erosion site), but as flows increase the flow path becomes aimed directly at the landslide area (Van Wormer 2005).

The unnamed stream at the site (see Photo 2) is fed by three small tributaries and numerous seeps along the lower slopes south of the creek. This stream had approximately 6 cfs flow at the existing Monte Cristo Grade Road during a January 2005 site visit. The active channel width varied between 3 and 10 ft. The presence of a 48-inch diameter culvert under the Monte Cristo Grade Road may indicate the need to accommodate occasional high flows. Each of the three small tributaries that flow into the stream were contributing 1-3 cfs. Many seeps also feed into the stream system (wetlands are discussed in greater detail in Section 3.3). The main channel of the unnamed stream meets the DNR Water Typing criteria for Type 3 Waters—those that are more than 2 feet in width (bankfull width) and have a moderate to slight fish, wildlife, and human use (WAC 222-16-031). The smaller tributaries that flow into the stream are probably Washington Department of Natural Resources (WDNR) Type 4 Waters—permanent, non-fish bearing stream—but additional field verification would be necessary. In terms of Snohomish County criteria, the stream is a Type 4 stream, while the three small tributaries meet Snohomish County criteria for Type 5 streams.

In addition to the large culvert for the stream system, a roadside ditch along the southern side of the road is drained by a 24-inch diameter culvert under the road near the eastern end of the eroding bluff. A roadside ditch also extends from the existing stream crossing

Photo 2. Unnamed stream that flows through the project site.

for several hundred feet to the west and connects with a large scrub-shrub wetland between the road and the slopes to the south.

3.2.2 Environmental Consequences

3.2.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, site hydrology and water quality would not be altered. It is likely that the South Fork Stillaguamish River channel will continue to migrate to the south, particularly during high flow events, and further erode the southern riverbank. This is likely to increase the length of the existing landslide at the site where relatively unstable slopes are undermined by river erosion. The erosion will continue to contribute sediment to the river for the foreseeable future. Eventually, the protruding ditch culvert will fall into the river resulting in additional alteration of hydrology patterns on the top of the bluff. Bank erosion along the steep bluff will continue to occur under all the alternatives.

3.2.2.2 Alternative B – North Alignment

Alternative B would require no stream crossings and would not directly affect surface waters (Figure 2-1). However, approximately 100-200 ft section of the new road segment would be located within 8 feet of the active channel of the unnamed perennial stream and would be built on top of inactive (abandoned) stream channels that have carried water in the relatively recent past. Construction would occur during the summer, minimizing the potential for erosion associated with significant rainfall events. Standard erosion control BMPs would be implemented during construction to prevent sedimentation of the stream and the river. According to Snohomish County Code (SCC)

30.62.310, standard buffer widths for the Snohomish County Critical Areas delineated as part of this study are as follows:

- Category 3 Wetlands (rural areas) – 50 feet
- Type 4 Streams – 50 feet
- Type 5 Streams – 25 feet

Over the long term, the new Alternative B road segment, being located on top of historic stream channel and in the direct flow path, may cause streamflows to be redirected toward the opposite bank. This could cause additional erosion, particularly along the 200 ft of stream immediately upstream of the culvert under the Monte Cristo Grade Road.

Overall, although patterns and direction of streamflows and geomorphic forces in the stream at the project site would be altered by implementation of Alternative B, this design is necessary to maintain the road and the streambank integrity. No hydrological effects to the South Fork Stillaguamish River would result from this alternative. Because of the adherence to stormwater control standards and construction BMPs, no additional mitigation measures would be necessary.

These protective buffer widths are established from the delineated boundary for wetlands and the ordinary high water mark for streams (extending on either side of the stream). Mitigation requirements for effects to the stream buffers would be coordinated with Snohomish County.

3.2.2.3 Alternative C – Middle Alignment

Alternative C would cross the unnamed stream and two of its tributaries (Figure 2-3). Construction would involve in-water work for bank stabilization and installation of culverts. In addition, this alternative would involve bank stabilization and construction of an 8-ft-tall, 275-ft-long MSE wall between the road and the stream in an area with numerous seeps. These construction activities are likely to cause temporary alteration of the stream's flow pattern and increase sedimentation in the stream above the Monte Cristo Grade Road. Construction BMPs would minimize excessive erosion potential during and after construction. As with Alternative B, a portion of the alignment would be within the buffer along the unnamed stream.

Over the long term, the bank stabilization, presence of the 275-ft-long MSE wall just upslope of the stream channel, and the three culverts may cause some effects to the stream hydrology and channel migration. Alternative C would cause minor sediment increases in the South Fork Stillaguamish River. The new road section would be a long-term source of sediment to the unnamed stream and the river, but the amount would be negligible in comparison to the existing sediment load of the river. Runoff from the road into the stream may also carry environmental contaminants, such as oil and grease from vehicles, into the aquatic system. Vehicle traffic would be infrequent and similar to the pre-disaster condition. Thus, these effects would be negligible.

3.2.2.4 Alternative D– South Alignment

The impacts to hydrology under Alternative D would be similar as under Alternative C, but would involve even more cut-and-fill activity due to the steep slopes (Figure 2-4). There would also be one additional stream crossing (for a total of four) that would affect hydrology and sediment transport in the tributary system. This alternative may cause additional sediment input, relative to Alternative C, due to the location and steeper slopes. The long-term impacts on hydrology would be similar to Alternative C.

3.3 VEGETATION AND WETLANDS

3.3.1 Affected Environment

Forests in the vicinity of the project site are dominated by western hemlock (*Tsuga heterophylla*), Douglas-fir (*Pseudotsuga menziesii*), and western red cedar (*Thuja plicata*). Deciduous species found in riparian and upland habitats are predominantly red alder (*Alnus rubra*), but small number of black cottonwood (*Populus trichocarpus*) and big-leaf maple (*Acer macrophyllum*) also occur. Within the Robe Valley sub-basin, 21, 9, and 2 percent of federal, state, and private forest lands, respectively, are considered to be mature (WDOE and SCPW 2003). The vegetation communities near the site have been affected both by stand-replacing fires and logging in the Stillaguamish watershed (Peter 1999, SLE 2004). Poor railroad, road, and culvert design and maintenance also lead to substantial riparian habitat degradation. Nonetheless, the riparian habitat in the Robe Valley sub-basin is considered to be "recovering" (WSCC 1999).

At the project site, the vegetation between the bluff and the unnamed stream is composed primarily of second-growth mixed conifer-deciduous forests dominated by western hemlock and red alder. The uplands have been heavily influenced by logging and previous grading activities, especially near the eastern end of the project site near Pilchuck Road. Narrow shrub-dominated riparian zones occur along the stream. The riparian species along the stream include salmonberry (*Rubus spectabilis*), vine maple (*Acer circinatum*), devil's club (*Oplopanax horridus*), and ninebark (*Physocarpus capitatus*). The seeps to the south of the unnamed stream and along the toe of the slope west of the existing creek crossing support a mix of hydrophytic and mesophytic vegetation, including: salmonberry, devil's club, and vine maple (Table 3.3-1). West of the existing Monte Cristo Grade Road stream crossing, the slopes to the south of the road are forested with large trees, including hemlock and red cedar up to 36 inches diameter at breast height (dbh). Table 3.3-1 provides a list of plant species observed during January site reconnaissance studies.

Three distinct areas at the project site were flagged during the February 2005 site visit, as meeting wetland definitions (see the Wetland and Stream Report in Appendix A). These three areas, which are approximately 0.1, 0.4, and 0.07 acres, are depicted on Figure 2-1. The three wetlands are all created by the complex series of seeps from the hillside. The wetland that occurs along the southern edge of the existing Monte Cristo Grade Road to the west of the creek crossing is formed from water from several seeps on the hillside collecting in the depression along the road.

Table 3.3-1. Plant Species Known to Occur in the Project Area.

Species	Scientific Name	Status	Vegetation Layer	Notes:
Douglas-fir	*Pseudotsuga menziesii*	FACU	Overstory	• Limited number.
Western Red Cedar	*Thuja plicata*	FAC	Overstory	• Limited number.
Western Hemlock	*Tsuga heterophylla*	FACU-	Overstory	• Common upland species.
Big-leaf Maple	*Acer macrophyllum*	FACU	Overstory	• Very limited in number.
Red Alder	*Alnus rubra*	FAC	Overstory	• Pervasive in disturbed areas and along the unnamed stream.
Black Cottonwood	*Populus balsamifera*	FAC	Overstory	• Small number of saplings
Indian Plum	*Oemleria cerasiformis*	FACU	Shrub	• Found throughout project site.
Red Osier Dogwood	*Cornus stolonifera*	FACW	Shrub	• Isolated individuals along river near debris chute.
Vine Maple	*Acer circinatum*	FACU	Shrub	• Small number.
Salmonberry	*Rubus spectabilis*	FAC+	Shrub	• Most common/dense shrub species in uplands, riparian zone, and wetland.
Thimble Berry	*Rubus parviflorus*	FACU+	Shrub	• Limited densities in shrub layer.
Ocean Spray	*Holodiscus discolor*	FACU	Shrub	• Small number along stream.
Red Elderberry	*Sambucus racemosa*	FACU	Shrub	• Limited in seeps and along stream.
Devil's Club	*Oplopanax horridus*	FAC	Shrub	• Limited densities in seeps.
Sword Fern	*Polystichum munitum*	FACU	Herb	• Common component of upland forest community.
Deer Fern	*Blachnum spicant*	FAC+	Herb	• Common component of riparian zone.
Lady Fern	*Athyrium filix-femina*	FAC	Herb	• Common component of riparian zone.
Bracken Fern	*Pteridium aquilinum*	FACU	Herb	• Fern of wet and disturbed areas.
Salal	*Gaultheria shallon*	FACU	Shrub	• Small number in upland zone.
Fringecup	*Tellima grandiflora*	FACU	Herb	• Most pervasive ground cover along road.
Piggy-back plant	*Tolmiea menziesii*	FAC	Herb	• Common in riparian zone
Foamflower	*Tiarella trifoliata*	FAC-	Herb	• Common in riparian zone
Common Horsetail	*Equisetum arvense*	FAC	Herb	• Found along disturbed roadside areas.
Skunk Cabbage	*Lysichiton americanum*	OBL	Herb	• Obligate wetland species found in site wetlands.

OBL: Plants that almost always occur (estimated probability >99%) in wetlands under natural conditions, but which may also occur rarely (estimated probability <1%) in nonwetlands. **FACW**: Plants that usually occur (estimated probability 67% to 99%) in wetlands, but also occur (estimated probability 1% to 33% in nonwetlands). **FAC**: Plants with a similar likelihood (estimated probability 34% to 66%) of occurring in both wetlands and nonwetlands. **FACU**: Plants that sometimes occur (estimated probability 1% to <33%) in wetlands, but occur more often (estimated probability 67% to 99%) in nonwetlands. **UPL**: Plants that rarely occur (estimated probability <1%) in wetlands, but occur almost always (estimated probability >99%) in nonwetlands under natural conditions.

Approximately 78% of historic wetlands in the Stillaguamish watershed have been impacted or lost (Gersib 1997). There are many riverine wetland sites that have been disconnected by historic flood control projects, although most of this has occurred well downstream of the project site where a large number of wetlands have been degraded by agricultural and urban land use.

3.3.2 Environmental Consequences

3.3.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, vegetation and wetlands would remain unaltered from current conditions. Continued erosion of the riverbank will reduce vegetated land over the long term at a slow rate. Avoiding actions to repair the Monte Cristo Grade Road would result in no impacts or effects to native vegetation communities and wetlands.

3.3.2.2 Alternative B – North Alignment

Under Alternative B, approximately 0.75 acre of native vegetation would be cleared (assuming an average 50-ft-wide cleared area along 660 ft of ROW). Virtually all of the affected vegetation would be upland communities and there would be no effects on the identified wetlands. Approximately 150 ft of the route would be within close proximity (10-15 ft) of the stream. In this particular segment, the construction may directly eliminate a small amount of riparian vegetation. Much of the vegetation that would be affected is previously disturbed, early successional forest with deciduous overstory tree species. Temporarily disturbed areas within the ROW would be revegetated with native species. For all the action alternatives, specific stream, wetland, and buffer mitigation requirements would be coordinated with Snohomish County in accordance with their Critical Areas Ordinance.

3.3.2.3 Alternative C – Middle Alignment

Under Alternative C, approximately 1.25 acres of native vegetation would be cleared (assuming an average 50-ft-wide cleared area). Approximately 0.5 acre would be previously disturbed, early successional upland forests near the eastern end of the alignment. A 260-ft-long segment near the creek would be located on steep slopes with numerous seeps and would directly affect approximately 0.3 acre of the plant communities there. Another 0.45 acre of upland forests—much consisting of mature hemlock trees that are up to 36 inches dbh—along the western third of the alignment would be eliminated. There are also several small depressions on the series of benches above the existing road near the western end of the alignment that have wetland vegetation communities that would be directly affected. The western end of the Alternative C alignment would also cross a scrub-shrub wetland that borders the Monte Cristo Grade Road. Following construction, temporarily disturbed areas within the ROW would be revegetated with native species.

Over the long term, the presence of the road upslope of the stream may affect the riparian and wetland/seep plant communities through altered hydrology and increased sedimentation as well as runoff of environmental contaminants (gasoline and oil).

A total of about 0.14 acres of Category 3 (Snohomish County rating system) wetland would be affected by Alternative C. Though each of these wetlands is small, the aggregate effects would require a U.S. Army Corps of Engineers (Corps) Clean Water Act Nationwide 404 Permit, as well as coordination with Snohomish County. It may be possible to avoid some wetlands, pending the final engineering design. If not, then

appropriate mitigation would need to be developed and implemented to meet the Corps' permit requirements and those of Snohomish County. Mitigation could consist of enhancing existing nearby wetlands and wetland and stream buffers and possibly revegetating a section of remaining roadbed. Additional mitigation regarding wetland buffers would likely be required under Snohomish County regulations.

3.3.2.4 Alternative D – South Alignment

Under Alternative D, approximately 1.3 acres of native vegetation would be cleared (assuming an average 50-ft-wide cleared area). As under Alternative C, approximately 0.5 acre would be previously disturbed, early successional upland forests near the eastern end of the alignment. Because the route would have four stream crossing as opposed to three and a long portion on the steep slope that has numerous seeps, slightly more (approximately 0.3 acre) riparian and seep-dominated communities would be affected. The impacts along the western portion of the alignment would be identical to those described in Alternative C. Temporarily disturbed areas within the ROW would be revegetated with native species.

Over the long term, the presence of the road upslope of the stream may affect the riparian and wetland/seep plant communities through altered hydrology and increased sedimentation as well as runoff of environmental contaminants (gasoline and oil).

A total of about 0.144 acres of Category 3 (Snohomish County rating system) wetland would be affected from Alternative D. Corps and Snohomish County requirements regarding mitigation would be similar to those of Alternative C, described below.

3.4 FISH AND WILDLIFE

3.4.1 Affected Environment

3.4.1.1 Wildlife

The native riparian corridor and managed forests surrounding the project site provide suitable habitat for a broad array of terrestrial wildlife species. Federally listed species under the Endangered Species Act (ESA) are discussed in Section 3.5.

During the January site reconnaissance, EDAW biologists only detected chickadee (*Poecile atricapillus* and *P. rufescens*) and American crow (*Corvus brachyrhynchos*) at the project site. However, the diversity of upland and riparian habitats and the proximity to the South Fork Stillaguamish River likely provide habitat for a variety of wildlife species common to forests of the Pacific Northwest including: various species of warblers, belted kingfisher (*Ceryle alcyon*), dark-eyed junco (*Junco hyemalis*), American robin (*Turdus migratorius*), brown creeper (*Certhia americana*), spotted towhee (*Pipilo maculatus*), red-tailed hawk (*Buteo jamaicensis*), black-tailed deer (*Odocoileus hemionus*), and small furbearers such as mink (*Mustela vision*) and weasel (*Mustela frenata*). The river is likely used by spotted sandpiper (*Actitis macularia*) and common merganser (*Mergus merganser*) that preferentially breed along the river and in riparian habitat and upland habitats.

The seeps and unnamed stream at the site appear to have habitat that is suitable for several amphibian species, such as coastal tailed frog (*Ascaphus truei*), Pacific giant salamander (*Dicamptodon tenebrosus*), and Pacific treefrog (*Hyla regilla*). Species such as western red-backed salamander (*Plethodon vehiculum*), rough-skinned newt (*Taricha granulosa*), red-legged frog (*Rana aurora*), and ensatina (*Ensatina eschscholtzii*) could occur in the riparian and upland habitats at the site. The tailed frog is a Washington State Monitor species and federal Species of Concern that has been documented in the lower section of Twenty-two Mile Creek, 0.5 mile southeast of the project site.

The larger conifer and deciduous trees near the western end of the project, especially those between the road and the river, may be suitable for bald eagles, osprey, and other raptors for use as perches as they forage along the river.

3.4.1.2 Fish

The South Fork Stillaguamish River supports a wide diversity of resident and migratory fish species. Most notable is the extensive variety of resident and anadromous salmonid species (i.e., salmon and trout) that comprise a recreational sport fishery on the river. The Stillaguamish River is managed for wild coho (*Oncorhynchus kisutch*) and chinook (*O. tshawytscha*) stocks; however, hatcheries have supplemented wild runs of summer chinook, chum (*O. keta*), and coho on this river since 1939 (Corps 1997, as cited in WSSC 1999). Hatchery-raised chinook, coho, and pink (*O. gorbushcha*) salmon were introduced to the upper South Fork above Granite Falls after 1954 with the construction of the Granite Falls Fishway. Since 1994, fishing for bull trout/Dolly Varden (*Salvelinus confluentus*) in the Stillaguamish has been closed. Hatchery-origin chinook, chum, coho, and steelhead (*O. mykiss*) are released annually into the Stillaguamish basin. In recent years, chinook salmon redds have been documented in the South Fork Stillaguamish River between RM 49.0 (less than 2 upstream of the project) and 64.5 (unpublished Washington Department of Fish and Wildlife [WDFW] data provided by C. Jackson). Approximately 51 miles (57 percent) of the 90 miles of stream in the Robe Valley sub-basin are thought to support anadromous fish populations (WSSC 1999).

The tributary stream at the project site supports resident fish. Unidentified salmonids were observed in several locations in pools and beneath cutbanks. These fish were most likely rainbow (*O. mykiss*) or cutthroat trout (*O. clarki clarki*). Other species, such as sculpin (*Cottus* spp.), also may inhabit the stream. The stream is clearly not accessible to anadromous fish in the South Fork Stillaguamish River due to the approximate 6-ft vertical drop below the existing culvert under the Monte Cristo Grade Road. It may be possible, however, for steelhead to access the culvert at extremely high river flows, but this is speculative. Most of the main channel of the stream has a moderate gradient and has a substrate composed of cobble and small boulders. The section of stream immediately upstream of the Monte Cristo Grade Road culvert has more sand and silt in the bottom.

Benson Creek, which flows into the South Fork Stillaguamish River approximately 0.2 mile downstream from the project site, is listed as a bull trout, coho, and steelhead supporting stream (StreamNet Data).

Table 3.4-1 lists the common species that occur in the South Fork Stillaguamish River or its tributaries in the vicinity of the project site. The general life stage timing of salmonids is illustrated in Figure 3.4-1.

Table 3.4-1. Anadromous and Resident Fish of the Monte Cristo Grade Road Area.

Species	Scientific Name	ESU/DPS	Federal Status	Project Area Use
Chinook Salmon	*Oncorhynchus tshawytscha*	Puget Sound ESU	FT, SC	Rearing and migration
Coho Salmon	*Oncorhynchus kisutch*	Puget Sound/Strait of Georgia ESU	FCo	Rearing and migration
Chum Salmon	*Oncorhynchus keta*	Puget Sound/Strait of Georgia ESU	_	Spawning and rearing; not spawn
Sockeye Salmon	*Oncorhynchus nerka*	(No designated ESU)	_	Rearing and migration
Pink Salmon	*Oncorhynchus gorbuscha*	(No designated ESU)	_	Rearing and migration
Steelhead	*Oncorhynchus mykiss*	Puget Sound ESU	_	Migration, spawning, and rearing
Cutthroat Trout	*Oncorhynchus clarki clarki*	Puget Sound ESU	_	Resident - all life stages
Rainbow Trout	*Oncorhynchus mykiss*	(No designated ESU)	_	Resident - all life stages
Mountain Whitefish	*Prosopium williamsoni*	(No designated ESU)	_	Resident - all life stages
Bull Trout	*Salvelinus confluentus*	Coastal Washington/Puget Sound DPS	FT, SC	Rearing and migration
sucker	*Catostomus* sp. cf. *catostomus*	_	_	Resident – all life stages

Status: **FT**=Federal Threatened; **SC**=State Candidate; **FCo**=Federal Species of Concern.
Sources: StreamNet website; NOAA Fisheries website; WDFW website.
ESU: Evolutionarily Significant Unit
DPS: Distinct Population Segment

3.4.2 Environmental Consequences

3.4.2.1 Alternative A – No Action Alternative

The No Action Alternative would avoid potential construction impacts at the project site and would not affect fish and wildlife. Human disturbance of fish and wildlife would remain at existing low levels because of the lack of vehicle access, although a trail allows pedestrian access.

Species	Life Phase	J	F	M	A	M	J	J	A	S	O	N	D
Chinook	Upstream Migration												
	Spawning												
	Incubation												
	Juvenile rearing												
	Smolt Outmigration												
Coho	Upstream Migration												
	Spawning												
	Incubation												
	Juvenile rearing												
	Smolt Outmigration												
Pink	Upstream Migration												
	Spawning												
	Incubation												
	Juvenile rearing												
	Smolt Outmigration												
Chum	Upstream Migration												
	Spawning												
	Incubation												
	Juvenile rearing												
	Smolt Outmigration												
Sockeye	Upstream Migration												
	Spawning												
	Incubation												
	Juvenile rearing												
	Smolt Outmigration												
Steelhead Summer	Upstream Migration												
	Spawning												
	Incubation												
	Juvenile rearing												
	Smolt Outmigration												
Steelhead Winter	Upstream Migration												
	Spawning												
	Incubation												
	Juvenile rearing												
	Smolt Outmigration												
Char	Upstream Migration												
	Spawning												
	Incubation												
	Juvenile rearing												
	Smolt Outmigration												
Searun Cutthroat	Upstream Migration												
	Spawning												
	Incubation												
	Juvenile rearing												
	Smolt Outmigration												

Figure 3.4-1. General Timing of Life Stages of Salmonids in the Stillaguamish Watershed. (source: WSCC 1999).

3.4.2.2 Alternative B – North Alignment

Temporary disturbance effects to area wildlife resulting from construction of Alternative B would cause wildlife to generally avoid the area. Noise disturbance from construction under this alternative would preclude use of surrounding habitat by area wildlife. There would be minimal noise disturbance to residential fish in the steam under this alternative.

Because no construction would take place in the South Fork Stillaguamish River or along its banks, there would be no direct effect on either resident or anadromous fish in the river itself. If resident fish do occur in the tributary stream at the site, construction-related noise and general disturbance could temporarily affect them. Direct impacts to resident fish and aquatic organisms during construction could also include short-term sedimentation and increased turbidity in the stream. However, no in-water work would be required under Alternative B, and the project would implement BMPs to prevent sediment entering the stream to minimize potential effects to resident fish in the stream. The magnitude of stress to fish generally increases as turbidity level increases and particle size decreases (Bisson and Bilby 1982). Because fish can readily disperse, many species may simply relocate when sediment load is increased (Barton 1977). This avoidance can expose fish to increased predation and energy expenditure.

Construction would affect approximately 0.75 acre of wildlife habitat, most of which is low-quality, early successional upland forest habitat. A small amount of riparian habitat would be affected along the stream. A portion (possibly up to 50 percent) of the 0.75 acres of habitat affected will be revegetated following construction. No mature trees would be removed by Alternative B.

After construction, the potential long-term hydrological changes described in Section 3.2.2.2 may, in turn, affect the habitat suitability for amphibians (e.g., Pacific giant salamanders and tailed frogs) and resident fish that occur in the stream. Effects could be caused by altered flow patterns and increased sedimentation and environmental contaminant runoff. Effects would be most likely within the 250-ft section of stream immediately upstream of the existing culvert under the Monte Cristo Grade Road. If the streambank is stabilized where the alignment is immediately adjacent to the stream, habitat for trout and amphibians and overall aquatic productivity could be reduced (Beamer and Hendersen, 1998; Dillon et al. 1998). Specific mitigation requirements would be determined by coordination with WDFW, the U.S. Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration (NOAA) Fisheries, and Snohomish County.

Vehicular and pedestrian traffic on the new road segment would be minor and similar to what occurred prior to the road wash-out. The road is expected to receive only occasional traffic because it is only 2 miles long and serves a small number of properties.

3.4.2.3 Alternative C – Middle Alignment

The temporary disturbance to fish and wildlife would be similar as under Alternative B, but because Alternative C includes a longer alignment, includes three stream crossings, includes more significant slope stabilization (275-ft-long retaining wall), and would affect seeps/wetlands, the disturbance impacts to amphibians and resident fish would be greater.

In terms of habitat impacts, this alternative would require the clearing of 1.25 acres of upland, riparian, and wetland wildlife habitats. Approximately 0.3 acre of riparian/seep/wetland would be affected near the stream, while 0.45 acre of mature conifer forest habitat that also has small wetland depressions would be affected near the western end of the alignment. The western end of the proposed alignment also would eliminate wetland habitat immediately along the Monte Cristo Grade Road. This latter wetland habitat, although narrow, has dense shrub cover and pockets of surface water that would be good quality wildlife habitat. Areas within the cleared ROW that are not actually occupied by the roadbed would be replanted with vegetation following construction.

After construction is completed, the presence of the road immediately upslope of the stream could result in long-term impacts to the aquatic habitat through sediment input, runoff of environmental contaminants, and altered hydraulics caused by bank stabilization. These impacts could lower the habitat quality for fish and amphibians that use the approximately 450 ft of main channel and tributary. The proper installation of culverts at each of the three stream crossings could reduce the potential for impacting fish and amphibians through degradation of habitat and restriction of movement (WDFW 2003). Temporary and permanent water crossing structure requirements are addressed in WAC 220-110-070 and are included in the WDFW Hydraulic Project Approval (HPA). All crossings would be designed in accordance with current WDFW criteria.

3.4.2.4 Alternative D – South Alignment

The impacts to fish and wildlife under Alternative D would be similar to those under Alternative C but would involve a longer period of construction due to the work on steep slopes. Alternative D would also affect the most wildlife habitat—1.3 acres—of any alternative. As with Alternative C, the cut-and-fill work and bank stabilization on the steep slopes would reduce riparian/wetland/seep wildlife habitat and could affect hydrology patterns at these sites. There would also be one additional stream crossing (for a total of four) that would affect additional aquatic, riparian, and wetland habitats. Proper culvert installation would minimize long-term impacts, while adherence to HPA requirements during construction would minimize short-term impacts. Because the road would be slightly farther from the main stream channel under this alternative, it may provide more of a buffer from sediment and environmental contaminant runoff impacts over the long term.

3.5 THREATENED AND ENDANGERED SPECIES

3.5.1 Affected Environment

Threatened and endangered species include all plant and wildlife species designated by the USFWS and NOAA Fisheries as threatened, endangered, or as candidates for listing under the ESA. No listed plant species are known to occur in the project area. A separate Biological Assessment (BA) has been be prepared for review by NOAA Fisheries and USFWS. The following sections describe the listed or candidate fish and wildlife species that occur in the area.

3.5.1.1 Fish

The fish species that occur in the South Fork Stillaguamish River in the vicinity of the project site include the Puget Sound ESU of chinook salmon (*Oncorhynchus tshawytscha*) (summer run), the Puget Sound/Strait of Georgia ESU of coho salmon (*O. kisutch*), and the Coastal Puget Sound DPS of bull trout (*Salvelinus confluentus*) (Table 3.5-1). The Puget Sound/Strait of Georgia ESU of chum salmon (*O. keta*) and the Puget Sound ESU of steelhead (*O. mykiss*) occur in the South Fork Stillaguamish River but have been determined not to warrant protection under ESA, although other distinct population segments of chum salmon and steelhead are protected under ESA. The South Fork Stillaguamish River in the project area is not included in the proposed Critical Habitat for chinook salmon but is proposed as Critical Habitat for bull trout.

Table 3.5-1. Federally Listed Species that Occur in the Monte Cristo Grade Road Area.

Species	Scientific Name	ESU/DPS	Status	Project Area Use
Chinook salmon	*Oncorhynchus tshawytscha*	Puget Sound ESU	FT	Primarily restricted to lower 17 miles of South Fork although some chinook spawn in South Fork upstream of project site.
Coho salmon	*O. kisutch*	Puget Sound/Strait of Georgia ESU	Candidate	Rearing and migration in South Fork Stillaguamish near project and Benson Creek (0.2 mi downstream of site).
Bull trout	*Salvelinus confluentus*	Coastal Washington/Puget Sound DPS	Threatened	Rearing and migration in South Fork Stillaguamish River and Benson Creek (0.2 mi downstream of site).

Status: FT=Federal Threatened; SC=State Candidate; FCo=Federal Species of Concern.
Sources: Unpublished WDFW data; StreamNet website; NOAA Fisheries website; WDFW website.

Anadromous fish access to the South Fork Stillaguamish River above Granite Falls, which was a natural anadromous fish barrier, is limited by poor attraction to the Granite Falls Fishway, poor entrance conditions at the fishway, sedimentation and flow problems, and by a rock fall in Robe Canyon that may be a migration barrier (WDFW 2004b). In addition to fish passing through the Granite Falls Fishway, there is a coho trapping and hauling program that transports small numbers of bull trout/Dolly Varden around Granite Falls and Robe Canyon.

3.5.1.2 Wildlife

The bald eagle (*Haliaeetus leucocephalus*) and the marbled murrelet (*Brachyramphus marmoratus*) are the only two listed wildlife species that are known to occur within 2 miles of the project. (No spotted owls [*Strix occidentalis*] have been documented in the project area; the nearest suitable habitat is on the slopes of Mt. Pilchuck, and only very small patches of larger trees occur near the potential road alignments.) The following is a brief description of these two species.

Bald Eagle

The bald eagle is protected as a state and federal threatened species in Washington. The USFWS has proposed delisting the bald eagle (64 FR 36454-36464). There are no known bald eagle nests within 2 miles of the project site; as of 2001, however, there were 32 bald eagle nest territories in Snohomish County—mostly in the western portion of the county (Stinson et al. 2001). During the winter months (November-March), bald eagles come from as far north as the Yukon and Alaska to forage on spawning salmon in western Washington rivers. It is unknown how many eagles actually use the immediate section of the South Fork Stillaguamish River, but it is likely that some eagles do use the South Fork Stillaguamish periodically. Regional eagle migration reaches its peak in late December and early January when the largest numbers of eagles are likely to occur in the vicinity of the project site.

Bald eagles may make use of the larger trees along the South Fork Stillaguamish River near the project site for night roosts and perches. No communal roosts have been identified in the WDFW Priority Habitats and Species (PHS) database.

Marbled Murrelet

The marbled murrelet is a state and federal endangered species in Washington. This species nests in forests that have at least remnant old-growth characteristics that enable them to find nesting platforms on large horizontal limbs. Adult murrelets nesting in the Stillaguamish watershed make daily flights between their nests and marine foraging areas in Puget Sound. The marbled murrelet has been documented within USFS forests within 0.4 mile of the Project (WDFW PHS data). The forests at the project site generally lack the structure (e.g., large trees with moss covered branches) necessary for nesting murrelets.

3.5.2 Environmental Consequences

A detailed effect analysis for federally protected species for the preferred alternative will be provided in a separate Biological Assessment (BA). The following narrative summarizes information to be included in the BA.

3.5.2.1 Alternative A – No Action Alternative

There would be no effects to threatened or endangered species under the No Action Alternative. Without repair of the Monte Cristo Grade Road, human disturbance in the project area would remain at the current low levels. The continued erosion along the river may remove a small number of potentially suitable bald eagle perch sites. There is the potential for additional bank slides and wash-outs that act as minor sediment sources to the Stillaguamish River, which would occur under all alternatives.

3.5.2.2 Alternative B – North Alignment

Alternative B is not likely to adversely affect any of the listed fish species because no work would occur within the South Fork Stillaguamish River or the unnamed stream. Listed fish species are not known to use the unnamed stream and, thus, would not be affected from construction within the floodplain. While steelhead are adept at overcoming obstacles, the perched culvert where the stream discharges into the Stillaguamish River is about 8 ft above the ordinary high water mark. Thus, it is unlikely that even steelhead have access to this stream.

There is a potential for increased sediment in the tributary stream during construction, but this would be minimized by implementation of BMPs. Riparian vegetation along the unnamed stream would be enhanced following construction disturbance.

Construction would not directly affect any nesting habitat for bald eagles or marbled murrelets. Nor would this alternative remove any bald eagle perch sites. Construction noise, which would be significantly higher than normal ambient levels, has the potential to disturb marbled murrelets. The project is 0.4 mile from areas that support marbled murrelets and construction noise could affect nesting birds if blasting occurs. Thus, according to USFWS guidelines (USDI 2003), no blasting should occur between April 1 and September 15. Assuming that construction takes place during the summer, there would be no effect on bald eagles because there are no bald eagle nests near the project.

For this alternative, the determination is No Effect for bald eagles and May Effect, Not Likely to Adversely Affect for marbled murrelet, salmon, and bull trout. There would be No Effect to listed or proposed critical habitat.

3.5.2.3 Alternative C – Middle Alignment

Alternative C would have the same effects on listed species as Alternative B, with some exceptions as described below.

Because Alternative C would be constructed in proximity to the unnamed stream, there is a greater potential for disturbed soil to enter the unnamed creek. Construction of stream crossings would be completed during the low flow period to minimize this potential. Even with protective BMPs, some sediment would enter the stream due to construction disturbance. These minor increases in sediment load would have negligible effects to listed fish in the mainstream Stillaguamish River, especially when considering the bedload of the river.

The level of noise disturbance to murrelets could be slightly greater because this alternative is about 75 to 100 ft closer to the documented murrelet activity area on Mount Pilchuck approximately 0.4 mile from the site. Because of the distance to the murrelet activity area and inclusion of seasonal restrictions on blasting, these potential, temporary noise effects would be minor.

Alternative C would remove a small number of large conifer trees near the western end of the alignment. Upon cursory inspection, some of the trees that would be removed are large enough to provide habitat for murrelets (i.e., nesting habitat). However, the overall stand quality and size do not meet the criteria for marbled murrelet habitat (McShane et al. 2004). Thus, the removal of the few large trees during construction would not affect marbled murrelets.

There would be no effect on the listed fish species. Construction during the dry period and the implementation of BMPs would ensure that there would be no effects to the South Fork Stillaguamish River and the unnamed stream water quality from construction.

There would be No Effects to bald eagles from implementation of Alternative C. For marbled murrelet, salmon, and bull trout, the determination is May Affect, Not Likely to Adversely Affect.

3.5.2.4 Alternative D – South Alignment

Alternative D would have essentially the same effects on listed species as Alternative C. Alternative D takes a more northerly route to avoid a wide portion in the unnamed stream and would cross the creek at a narrow section. This would require the crossing of two small stream tributaries. There is a benefit to crossing a narrower stream section, but this may be offset by having to cross the two tributaries and construct through the wetland seeps. Because of the difficulty of constructing on the hillslopes, there is a greater change for sedimentation to reach the creek under Alternative D. As in Alternative C, the Alternative D design includes culvert or box culvert openings for the average flow under the road with a reinforced dip in the road to allow water to flow over the road during storms.

The one exception is that a portion of the Alternative D alignment would be 400 ft farther upslope and potentially closer marbled murrelets. This could slightly increase the chance of causing disturbance if work were performed during the nesting season. Seasonal restrictions on blasting would be the same as Alternative B. Because of the larger number of creek crossings and the disturbance of hillside seep wetlands, there is a greater

potential for construction-caused sediment to reach the unnamed stream and the river. BMPs would minimize, but not eliminate this potential.

Alternative D would have No Effect on bald eagles, and May Affect, but No Likely Effect chinook salmon, bull trout, and marbled murrelets.

3.6 RECREATION RESOURCES

3.6.1 Affected Environment

The 2-mile-long Monte Cristo Grade Road provides access to eight properties with one residence along the southern bank of the South Fork Stillaguamish River. The existing road is currently maintained by Snohomish County. In its current condition, the Monte Cristo Grade Road does not provide public access to any developed recreation facilities. However, the road does access to three known waterfalls that draw recreational visitors (Snohomish County website). These waterfalls include:

- **First Falls**—A 30- to 40-foot cataract along an unnamed creek 0.3 mile west of the wash-out.

- **Heather Creek Falls**—A series of cascades accessible by hiking from a small pond located 0.6 mile west of First Falls.

- **Triple Creek Falls** – A 15- to 25-foot lower and 40-foot upper falls accessible by a 200-yard hike from the western end of the Monte Cristo Grade Road.

The primary recreational activities on the South Fork Stillaguamish River itself include angling and whitewater boating. Fishing season upstream of Granite Falls occurs between June 1 and November 30 (WDFW 2004a). Limited whitewater rafting occurs in the upper South Fork, with the season generally beginning in April and ending in July. There are no official boat access points in the project area.

The Mountain Loop Highway, which is currently closed between Barlow Pass and the town of Darrington due to a large road wash-out, is a popular recreation access road. Within the Verlot area, many visitors hike on the many miles of USFS trails in the area. Closest to the project site is the Mt. Pilchuck Trail (USFS Trail #700). The trailhead for this trail is located 6.9 miles from the Mountain Loop Highway along Road #42, which meets the Monte Cristo Grade Road at the eastern end of the project site. The Mt. Pilchuck Trail receives heavy use during the summer and fall seasons (USFS website).

3.6.2 Environmental Consequences

Each of the alternatives is described below in terms of its potential impacts to recreation resources.

3.6.2.1 Alternative A – No Action Alternative

Under Alternative A, the wash-out segment of the Monte Cristo Grade Road would not be restored. This alternative would not affect recreation resources relative to existing conditions. Because persons have to hike from the junction with the Pilchuck Road, the existing wash-out likely does reduce the number of recreational visitors to the three waterfalls along the road compared to what would visit if the road were repaired.

3.6.2.2 Alternative B – North Alignment

Under Alternative B, the wash-out segment of the reconstructed Monte Cristo Grade Road would not result in long-term adverse impacts to recreation resources. Because all work would be away from the river, there would be no effect on continued recreation use of the riverbank upstream and downstream of the wash-out during construction. Once repaired, the recreational use is likely to be at the same level as occurred prior to the road wash-out.

3.6.2.3 Alternatives C and D – Middle and South Alignments

Impacts on recreation resulting from Alternative C or D would be identical to those caused by Alternative B. Because the road would be farther from the riverbank, the visual quality for recreationists along the river would be slightly enhanced relative to Alternative B.

3.7 VISUAL RESOURCES

3.7.1 Affected Environment

The general visual character of the South Fork Stillaguamish River corridor, including the wash-out section of the Monte Cristo Grade Road, is mountainous with periodic vistas of forested hillsides and river valleys. The vegetation along the road, including the wash-out section, is typical of the Puget Sound foothills. The deciduous-coniferous tree canopy is dominated by western hemlock, red cedar, and red alder, while the understory consists primarily of native shrub species. Large conifer trees are restricted to the USFS land to the south of the project site, except near the western end of the project site where a stand of large conifers occurs near the Monte Cristo Grade Road. Several residences and cabins are visible on the north side of the river directly across from the wash-out. The wash-out bluff itself is visible from the Highway 92 bridge just upstream of the site, as well as from the residences along the riverfront on the opposite side of the river. The bluff is similar in appearance as the bluffs at the Gold Basin that are also visible from the Highway 92 bridge (upstream from the bridge).

3.7.2 Environmental Consequences

The following sections discuss the potential effects on visual resources from each alternative.

3.7.2.1 Alternative A – No Action Alternative

Under Alternative A, the wash-out segment of the Monte Cristo Grade Road would not be restored and there would be no effects to visual resources. The existing wash-out is comparable to other wash-outs along the South Fork Stillaguamish River and is not visually inconsistent with natural features upstream and downstream of this section. Segments of the damaged road are likely to be eroded by future channel migration while other areas would naturally revegetate and will not detract from the visual character of the area in the long term.

3.7.2.2 Alternative B – North Alignment

Construction associated with the Alternative B alignment would have temporary impacts on the visual character of the river, by increasing noise and human activity significantly beyond typical background levels. Once constructed, the new road would be visible from the Mountain Loop Highway Bridge and the private residences on the north side of the river. This would be similar to the pre-disaster conditions. There are many other locations in the watershed where unimproved roads are visible from primary roads; thus, the reconstruction of the road segment would not cause a significant change in the visual quality.

3.7.2.3 Alternative C – Middle Alignment

Construction of the Alternative C alignment would cause minor, temporary adverse visual effects to users of the river corridor. The noise and increased human activity would be a minor disturbance element to anyone using the river. Aside from these temporary effects during construction, building this alignment would not cause adverse effects to the visual quality of the vicinity. The Alternative C alignment would be away from the river and partially screened by existing vegetation. Over the long term, vegetation growth would obscure the road from the river and the Mountain Loop Highway Bridge. No mitigation measures beyond construction BMPs would be necessary for this alternative.

3.7.2.3 Alternative D – South Alignment

Construction of the Alternative D alignment would have essentially the same effects on visual resources as Alternative C.

3.8 ENVIRONMENTAL JUSTICE

In the past decade, the concept of Environmental Justice has emerged as an important component of federal regulatory programs, initiated by Executive Order (EO) No. 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations. This Executive Order directed each federal agency to "make achieving environmental justice by avoiding disproportionately high or adverse human health or environmental effects on minority and low-income populations" a part of its mission. EO 12898 emphasized that federally recognized Native tribes or bands are to be included in all efforts to achieve environmental justice (Section 6.606).

3.8.1 Affected Environment

The demographics of the affected area were examined to determine the presence of minority populations, low-income populations, or tribal peoples in the area potentially impacted by the proposed action. The race and ethnic profile of the local census tract from the 2000 census for the heavily rural census tract 536.02 (east of Granite Falls) is presented in Table 3.8-1. These percentages were based on a tract population of 4,564 persons. Snohomish County as a whole has a smaller percentage of Native Americans (1.4%), and a larger contingent of African Americans (1.7%) and Asians (5.8%).

As part of the NEPA scoping process, a site meeting was held with Tribal contacts, as detailed in Chapter 4, Consultation and Coordination.

Table 3.8-1. Race and Ethnicity Profile of Census Tract 536.02, Snohomish County, WA.

Race or Ethnicity	Percentage of Population
White	94.8
Black or African American	0.5
American Indian or Alaskan Native	2.3
Asian	1.0
Native Hawaiian and Other Pacific Islander	0.4
Some other race	1.0

Source: 2000 Census website.
*Percentage adds to more than 100% because Hispanic and Latino is a category of ethnicity and includes more than one race category (black, white, etc.)

3.8.2 Environmental Consequences

Under the No Action Alternative, conditions would remain the same at the site and there would be no disproportional impacts to low income or minority populations. The actions in all three action alternatives—B, C, and D—are limited in scope, would return the previous function of the road, and would have no effects to low income or minority populations.

3.9 CULTURAL RESOURCES

3.9.1 Affected Environment

Cultural resources include resources of historical and/or archaeological significance. For purposes of this document; the term “archaeological resources” is used to refer to prehistoric or historical subsurface sites or objects, and the term “historic resources” is used to refer to historic structures or districts.

According to geospatial data of the Washington State Historic Preservation Office (SHPO), which documents the occurrence of National and State Historic Register resources, Historic Property Inventories, and Historic/Archaeological Sites and Districts, there are no documented historic or archaeological resources in the vicinity of the project site (SHPO 2004). The Stillaguamish River drainage is of cultural importance to the

Stillaguamish and Tulalip Tribes, whose people have historically made use of its resources and used the river as a travel corridor. No specific references of important features were supplied by the Stillaguamish or Tulalip Tribal representatives during a site visit.

3.9.2 Environmental Consequences

3.9.2.1 Alternative A – No Action Alternative

Under Alternative A, the roadway would not be restored. It is possible that some artifacts may be in or near the existing road prism that could be affected by continued riverbank erosion. The extent of this possibility is unknown. There would be no effect to cultural resources outside of natural processes.

3.9.2.2 Alternative B – North Alignment

Under Alternative B, construction would develop a new roadway segment to restore vehicular access along Monte Cristo Grade Road. While the general area is known to have been used by local Tribes, no specific resources have been identified in the area by the Tribes or the SHPO. While there are no documented sites in the area, construction could uncover previously unknown artifacts. If this occurs, construction would be halted and a qualified archaeologist would examine the site and consult with the SHPO and the Tribes. A report would be prepared to document the occurrence and the final resolution of the consultation process. Give these provisions and the lack of documented resources in the area, there would be no effects to cultural resources from Alternative B.

3.9.2.3 Alternative C – Middle Alignment

The impacts and mitigation measures for Alternative B would also apply to Alternative C.

3.9.2.4 Alternative D – South Alignment

The impacts and mitigation measures for Alternative B would also apply to Alternative D.

3.10 TRANSPORTATION AND ACCESS

3.10.1 Affected Environment

The vicinity of the proposed project is served by a limited network of roads that include local highways and primitive gravel roads. The Monte Cristo Grade Road is a gravel roadway that extends approximately 2 miles westward from its intersection with Pilchuck Road, about 0.1 mile east of Verlot, WA, along the southern bank of the South Fork Stillaguamish River. The road provides access to one residence and seven unimproved properties.

After the wash-out occurred, Monte Cristo Grade Road was closed to general vehicular traffic. As previously discussed, Snohomish County has installed a concrete barrier near the intersection with Pilchuck Road. Private property owners must access their property by walking around the wash-out on a well-developed trail.

3.10.2 Environmental Consequences

3.10.2.1 Alternative A – No Action Alternative

Under Alternative A, the roadway would not be restored. The private properties on Monte Cristo Grade Road west of project site would continue to have no vehicle access.

3.10.2.2 Alternative B – North Alignment

Alternative B would re-establish vehicle access for landowners downstream of the wash-out. The road would be built to standards similar to the existing segments. In the long term, this section of road may still be vulnerable to channel migration and the corresponding erosion associated with flood flows. It is difficult to assess the potential for this to occur, but given the recent dynamics of the river there is reason to assume that it is likely at some time in the future. If this were to occur, vehicle access would again be eliminated.

3.10.2.3 Alternative C – Middle Alignment

This alternative also would re-establish vehicle access to the affected properties. Because it is upslope and away from the river, however, it would not be vulnerable to future channel migration. Because this alternative is away from the river floodplain, it would not be affected by future channel migration and would better ensure long-term vehicular access to the affected properties.

3.10.2.4 Alternative D – South Alignment

This alternative also would re-establish vehicle access to the affected properties but, similar to Alternative C, it is upslope and away from the river. Similarly, it would not be affected by future channel migration and would ensure long-term vehicular access.

3.11 SOCIOECONOMICS

3.11.1 Affected Environment

The four primary industry types in the local area are manufacturing; education, health, and social services; construction; and agriculture, forestry, fishing and hunting, and mining (U.S. Census 2000). The Monte Cristo Grade Road provides access to a small number of private residential properties, of which seven are currently undeveloped. One of the properties includes a residence.

3.11.2 Environmental Consequences

The estimated cost of each alternative is provided in Table 3.11-1. Though FEMA cannot fund a property buy-out that requires condemnation, the assessed value of the affected properties is not provided under the No Action Alternative cost.

Table 3.11-1. Estimated Cost of Each Alternative for the Monte Cristo Grade Road Project.

Alternative	Cost
Alternative A--No Action Alternative –does not include buyout	$0
Alternative B	$566,000
Alternative C	$1,800,000
Alternative D	$1,900,000

Source: Van Wormer 2005.

The No Action Alternative could be implemented without buyout of the properties by simply closing the damaged road. There would be no project cost associated with this option, but there would be no vehicle access for landowners. While individual property owners would be inconvenienced from such action, there would be minimal socioeconomic impacts at the macro scale.

The costs of building Alternative B, C, or D are substantial because of the difficult terrain and the physical and environmental constraints of the site. Alternatives C and D are much longer and built on steeper terrain than Alternative B and would require mitigation for effects to wetlands and streams. These costs would be born by federal, state, and county tax-payers. There would be no direct costs applied to the affected landowners.

Because the area is zoned for one structure per lot, there would be minimal further development along the rebuilt road.

3.12 CUMULATIVE IMPACTS

Cumulative impacts are those that result from the incremental impact of a proposed action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other action (40 CFR 1508.7). Only those resources associated with cumulative effects are discussed below.

The project is in rural Snohomish County in an area dominated by federally owned forest, with scattered private and state-owned land. Land-disturbing activities in the basin include forestry and associated road building, residential housing construction, and minor amounts of mining (WSCC 1999). A number of flood repair road projects are being planned in the basin on federal and county land including culvert and bridge wash-out repairs on USFS land and a number road shoulder repairs in the Stillaguamish River drainage. The landslides at Gold Basin are a high priority for stabilization to minimize sediment input to the river. Such activities just upstream of the project could interact with the proposed project. Lastly, Snohomish County is in the process of updating its

Critical Areas Ordinance, which will provide restrictions for land development near sensitive natural resources and requirements for mitigation of impacts.

For aquatic and terrestrial natural and physical resources, there would be no cumulative impacts associated with the No Action Alternative. Natural processes will continue to erode the right bank, but this is the natural occurrence in a dynamic alluvial river system.

Under Alternative B, construction would occur close to the river and would cause minor amounts of sediment to enter the river from construction and in the long term. The scale of the effects to aquatic resources is negligible in comparison to the scale of effects from upstream landslides, forestry, previously constructed unimproved roads, and other natural events in the basin. The road would re-establish vehicle access for landowners and could lead to future development of seven properties that are currently undeveloped. The area is zoned as one per lot so development would be minimal and would not significantly contribute to basin-wide cumulative effects from land clearing.

Alternatives C and D would have similar but slightly greater cumulative impacts compared to Alternative B because of the longer length of these road options, the proximity to the creek and its tributaries, and the increased potential of sedimentation from construction on steep slopes and in wetlands.

4.0 CONSULTATION AND COORDINATION

4.1 SCOPING

On February 9, 2005, a site visit was held with FEMA and the representatives of the Stillaguamish and Tulalip Tribes to discuss the merits of the alternatives and the issues of concern for the Tribes. A similar meeting was held on site on March 1, 2005 with representatives of WDFW, USFWS, NOAA Fisheries, and the Washington State Emergency Management Division. Tables 4.1-1 and 4.1-2 list the attendees of those meetings.

Table 4.1-1. Staff that Attended the February 9, 2005 Monte Cristo Grade Road Site Visit.

Tribal/Agency Affiliation	Staff
Tulalip Tribe	Dave Luzi
Stillaguamish Tribe	Pat Stevenson
FEMA	Bert Bowen
FEMA/EDAW	Jim Keany

Table 4.1-2. Staff that Attended the March 1, 2005 Monte Cristo Grade Road Site Visit.

Agency Affiliation	Staff
USFWS	Suzy Lute
NOAA Fisheries	Dan Tonnes
WDFW	Phil Jensen
Washington Military Department Emergency Management Division	Virginia Haas
Washington Military Department Emergency Management Division	Gary Urbas
FEMA/EDAW	Jim Keany

Primary issues raised by the Tribes and agencies included the following:

- Road alignment effects to aquatic systems and listed fish.
- Potential for new road to be affected by channel migration of stream.
- High cost of project for a low benefit providing access for one resident.
- Potential archaeological resource effects.
- Option of landowner buy-out to preclude need for road rebuilding.
- Effects of building close to river.
- Longevity of a new road built close to the river.

4.2 AGENCY AND TRIBAL COORDINATION

FEMA has had continued coordination with Tribal entities and state and federal resource agencies throughout the NEPA process. The Tribes and agencies will comment on the Draft EA, and these comments will be addressed and incorporated into the final document. In addition, a separate Draft BA has been prepared for review by USFWS and NOAA Fisheries as mandated by the ESA. Any recommendations that come out of that process will be incorporated into the Final BA and NEPA document.

Several meetings and additional phone calls were conducted with Tribal entities in regard to cultural resources. While the SHPO's office had no data on the project vicinity, they requested that results of the Tribal coordination be sent to their office. Upon completion of the NEPA process, this information will be sent to the SHPO's office.

4.3 OTHER LAWS AND REGULATIONS

State, federal, and local laws that apply to the project, depending on the alternative, include the following:

- Section 313 of the Federal Clean Water Act – Stormwater Management and Erosion Sediment Control
- Section 404 of the Clean Water Act
- Section 10 of the Rivers and Harbors Act
- State Water Quality Standards for Construction Projects
- State Hydraulic Project Approval
- State/Snohomish County Shoreline Management Regulations
- Snohomish County Critical Areas Ordinance

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APPENDIX A

Monte Cristo Grade Road Wetland and Stream Report

(Bound Separately)

APPENDIX B

Best Management Practices (BMPs)

Appendix B

Mitigation Measures included in the Alternatives Analyzed

All Action Alternatives

Project Design

- Stream crossings will be designed to withstand erosive storm flows by armoring the uphill side with gabions and with a sag in the road to provide high flows to pass over the road.

- Temporarily disturbed areas at stream crossings will be restored with native vegetation following construction.

Permits and Regulations

- The project will implement conditions included in any Hydraulic Project Approval (HPA) permit provided by WDFW.

- Mitigation required by Snohomish County's Critical Areas Ordinance would be developed in coordination with Snohomish County staff.

- No in-water work will be conducted in the mainstem Stillaguamish River.

- Coordination will be conducted with the Corps regarding Section 404 permit for affecting several small wetlands along the new alignment.

Stormwater Control

- A site-specific Spill Prevention, Control, and Countermeasures (SPCC) Plan will be developed and implemented to ensure that all pollutants are controlled and contained.

- The project will implement stormwater control according to the State of Washington NPDES Storwater Construction guidelines.

- In the event of unexpected rainfall, all concrete, paving, paint, paint remover, or other potentially harmful chemicals will be contained and prevented from leaving the construction area.

- Fueling and maintenance of equipment will occur more than 300 feet from surface water or wetlands, to the extent practical.

Sediment Control

- An Erosion and Sedimentation Control Plan (ESCP) will be prepared and implemented for all projects that require earth-moving, vegetation removal, or soil compaction. If the project includes excavation below the water table, the turbid water will be de-watered to the adjacent vegetated floodplain for infiltration and BMPs will be implemented to eliminate risk of runoff.

- Sediment containment will be completed using booms or portable rubber cofferdams. Turbid water generated by excavation below the water table will be pumped from the excavation area and discharged to the flat, vegetated floodplain.

- Any work required near the unnamed stream will be performed upstream to downstream, and turbidity monitoring will ensure compliance with State standards.

- Exposed soil will be stabilized within 7 days of disturbance.

- Disturbed areas will be restored and revegetation implemented using plants native to the area.

- Temporary storage piles will not be placed in the 100-year floodplain from October 1 to May 1. Storage piles used in the project within 12 hours will not be considered as temporary storage.

- Project-caused unstable slopes will be stabilized as soon as possible.

- Blasting will use barriers to keep material from entering the unnamed tributary or the Stillaguamish River.

Clearing and Disturbance

- Clearing and grading will be limited to the minimum necessary to complete the project. Boundaries of clearing will be clearly marked.

- Removed debris will be disposed of at an appropriate upland location.

- No temporary access roads will be constructed in addition to the primary road corridor.

Stream Habitat and Fisheries

- Installation of gabions in crossings of Type 4 and 5 streams or other bank protection will be conducted outside the wetted perimeter to the extent possible.

Implementation

- The Applicant is responsible for Conservation Measure success to ensure desired outcomes. The Applicant will be required to monitor and maintain Conservation Measures to control erosion and sediment, reduce spills and pollution, and provide habitat protection. Failure to properly implement Conservation Measures may result in loss of all financial assistance provided for that project.